UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

PARTIALLY REVISED DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO.: **MA0100595**

NAME AND ADDRESS OF APPLICANT:

City of Attleboro
Department of Water and Wastewater
Government Center, 77 Park Street
Attleboro, MA 02703

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Attleboro Water Pollution Control Facility
Pond Street
Attleboro, MA 02703

RECEIVING WATER: **Ten Mile River**

CLASSIFICATION: **B (Warm Water Fishery)**

I. Proposed Action

In response to a timely application by the City of Attleboro, Massachusetts, for reissuance of the above-referenced National Pollutant Discharge Elimination System (NPDES) permit, the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) made a draft permit and fact sheet available for public notice on August 16, 2006 and accepted comments on the proposed action until September 14, 2006. Comments received on the draft permit from the State of Rhode Island Department of Environmental Management raised substantial new questions regarding whether the monthly average total phosphorus limit of 0.2 mg/l (effective April through October) was sufficiently stringent to ensure compliance with applicable Water Quality Standards in Massachusetts and Rhode Island and relevant provisions of the Clean Water Act. Based on an analysis of the comments, as well as other technical information and guidance in the administrative record, EPA has determined that the monthly average total phosphorus limit for the months of April through October must be reduced from 0.2 mg/l to 0.1 mg/l in order to assure that water quality standards in each affected state will be met.

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The agencies have further concluded that a limited opportunity for interested persons to comment on this specific change to the draft permit will assist the agencies in their deliberations and improve the quality of the final permit decision. We are, therefore, reopening public comment on the draft permit pursuant to 40 C.F.R. § 124.14(b). In accordance with 40 C.F.R. § 124.14(c), comments filed during the reopened comment period shall be limited to the "substantial new questions that caused its reopening," which in this case pertain only to the revised monthly average total phosphorus limit.

This revised Fact Sheet sets forth the record basis for the new total phosphorus limit, which supersedes the section entitled "Phosphorus" appearing on pages 6 to 8 in Section IV.D ("Permit Limits and Explanation of Effluent Limitation Derivation"; "Limits Derivation"; "Phosphorus") of the original Fact Sheet that accompanied the August 16, 2006 draft permit. In all other respects, the original draft permit and the original Fact Sheet remain in place and are not subject to re-opened comment. Comments outside the scope of the revised total phosphorus limit shall not be considered.

IV. Permit Basis and Explanation of Effluent Limitation Derivation.

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D. Limits Derivation

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Phosphorus:

Massachusetts Water Quality Standards do not contain a numeric criterion for total phosphorus. The narrative criterion for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients "shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication." Massachusetts Standards also require that "any existing point source discharges containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients." *See* 314 CMR 4.04(5). MassDEP construes "highest and best practical treatment" for POTWs as a monthly average total phosphorus limit of 0.2 mg/l.

In the absence of a numeric criterion for phosphorus, EPA looks to nationally recommended criteria, supplemented by other relevant materials, such as EPA technical guidance and information published under Section 304(a) of the CWA, peer-reviewed scientific literature and site-specific surveys and data. *See* 40 CFR § 122.44(d)(1)(vi)(B). EPA has produced several guidance documents which set forth total ambient phosphorus concentrations that are sufficiently stringent to control cultural eutrophication and other adverse nutrient-related impacts. These

guidance documents present protective in-stream phosphorus concentrations based on two different analytical approaches. An effects-based approach provides a threshold value above which adverse effects (*i.e.*, water quality impairments) are likely to occur. It applies empirical observations of a causal variable (*i.e.*, phosphorus) and a response variable (*i.e.*, chlorophyll *a*) associated with designated use impairments. Alternatively, reference-based values are statistically derived from a comparison within a population of rivers in the same eco-region class. They are a quantitative set of river characteristics (physical, chemical and biological) that represent conditions in waters in that ecoregion that are minimally impacted by human activities (*i.e.*, reference conditions), and thus by definition representative of water without cultural eutrophication. While reference conditions, which reflect minimally disturbed conditions, will meet the requirements necessary to support designated uses, they may also exceed the water quality necessary to support such requirements.

The 1986 Quality Criteria of Water ("Gold Book") follows an effects-based approach. It sets forth maximum threshold concentrations that are designed to prevent or control adverse nutrient-related impacts from occurring. Specifically, the Gold Book recommends in-stream phosphorus concentrations of no greater than 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir. A more recent technical guidance manual, the Nutrient Criteria Technical Guidance Manual: Rivers and Streams (EPA 2000) ("Nutrient Criteria Technical Guidance Manual"), cites to a range of ambient concentrations drawn from the peer-reviewed scientific literature that are sufficiently stringent to control periphyton and plankton (two types of aquatic plant growth commonly associated with eutrophication). This guidance indicates in-stream phosphorus concentrations between 0.01 mg/l and 0.09 mg/l will be sufficient to control periphyton growth and concentrations between 0.035 mg/l and 0.070 mg/l will be sufficient to control plankton (see Table 4 on page 101).

EPA has also released recommended ecoregional nutrient criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters in that ecoregion that are minimally impacted by human activities, and thus free from cultural eutrophication. Attleboro is within Ecoregion XIV, Eastern Coastal Plains. The recommended total phosphorus criterion for this ecoregion, found in Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV (2000), is 24 ug/l (0.024 mg/l).

Unlike Massachusetts, Rhode Island Water Quality Regulations establish a numeric criterion for nutrients for certain bodies of water:

> "Average Total Phosphorus shall not exceed 0.025 mg/l in any lake, pond, kettlehole or reservoir, and average Total P in tributaries at the point where they enter such bodies of water shall not cause exceedance of this phosphorus criteria, except as naturally occurs, unless the Director determines, on a site specific basis, that a different value for phosphorus is necessary to prevent cultural eutrophication." Rule 8.D.(2).

The current permit has a monthly average total phosphorus limit of 1.0 mg/l and a daily maximum limit of 1.5 mg/l, each in effect from May 1 to October 31. Total phosphorus effluent data from DMRs submitted in 2003 and 2004 for the months of April through October ranged from 0.1 to 0.3 mg/l.

The impacts associated with the excessive loading of phosphorus are documented in the Ten Mile River Basin 1997 Water Quality Assessment Report published by MassDEP in March 2000, the Massachusetts Year 2004 Integrated List of Waters and the RI 2004 303(d) List of Impaired Waters. The Ten Mile River is listed on the Massachusetts Year 2004 Integrated List of Waters (which incorporates the CWA § 303(d) list) as a water that is impaired (not meeting water quality standards) and requires one or more Total Maximum Daily Loads (TMDL) to be prepared to reduce pollutant loadings into the River so that it can attain water quality standards. The segment of the Ten Mile River from the North Attleborough WWTP to the MA/RI border, which includes the discharge from the Attleboro treatment plant, is listed as impaired due to unknown toxicity, metals, nutrients, organic enrichment/low dissolved oxygen, pathogens, and noxious aquatic plants. No TMDL has been completed nor is any underway. The free flowing segments of the Ten Mile River in RI are listed on the State's 2004 CWA § 303(d) List of Impaired Waters as waters needing a TMDL for copper, lead, and cadmium. Two impoundments are also listed. Turner Reservoir is listed for copper, lead, low dissolved oxygen, and phosphorus. Omega Pond is listed for copper, lead and phosphorus.

Due to the absence of any significant dilution under 7Q10 conditions in the receiving waters, the monthly average limit of 1.0 mg/l in the current permit would be expected to significantly exceed the protective values contained in EPA's national technical guidance and the available scientific literature in the record, as well as the EPA recommended criterion.[1] Within this range of concentrations (*e.g.*, 0.01 mg/l to 0.1 mg/1), eutrophication is expected to be controlled. To effectively address the documented eutrophication in the Ten Mile River and downstream impoundments, ambient phosphorus concentrations must be brought within this protective range. In order to do so, the Permittee's existing phosphorus effluent limits must be made more stringent.

Given the lack of effective dilution under 7Q10 flow conditions, a monthly average total phosphorus effluent limit of 0.1 mg/l has been established to ensure that the Gold Book recommended value of 0.1 mg/l will not be exceeded in the Massachusetts reaches of the river below the discharge. In addition to being consistent with the Gold Book, 0.1 mg/l limit also falls within the range of effects-based values cited in the Nutrient Criteria Technical Guidance Manual and in the peer-reviewed scientific literature after adjustments are made to account for the differing flow assumptions used to determine those values (*i.e.*, 7Q10 versus 2 or 3-month

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[1] What little dilution is available (see Attachment B of the original Fact Sheet) consists almost entirely of flow from the North Attleborough Wastewater Treatment Facility, which itself contains significant quantities of phosphorus.

summer seasonal flows). *See, e.g., Developing Nutrient Targets to Control Benthic Chlorophyll Levels in Streams: A Case Study of the Clark Fork River* (Dodds *et al.*, 1997) at p. 1739 (citing use of flows from June 21 to September 21 to calculate recommended values); *Suggested Classification of Stream Trophic States: Distributions of Temperate Stream Types by Chlorophyll, Total Nitrogen, and Phosphorus*, (Dodds *et al.*, 1998) (citing use of 2-3 month seasonal means).

EPA also believes that the limit of 0.1 mg/l will ensure attainment of Rhode Island water quality criteria of 25 ug/l, which applies to Turner Reservoir downstream of the state line. The Ten Mile River below the discharge flows into an impoundment at the Massachusetts/Rhode Island border and then, from the outlet of this impoundment, flows approximately one mile before entering Turner Reservoir. The additional drainage area between the Attleboro discharge and Turner Reservoir of approximately 18 square miles adds approximately 3 cfs of additional dilution under 7Q10 flow conditions. Additionally, there will be some natural uptake of phosphorus by the aquatic plant biomass, as will occur even in a high quality receiving water.

The limit of 0.1 mg/l will be in effect from April 1 to October 31. The application of the lower seasonal limit has been extended to the month of April in order to encompass the entire season when there is active aquatic plant growth.

In addition to the monthly average total phosphorus limit of 0.1 mg/l proposed for the months of April though October, the draft permit contains a winter period total phosphorus limit of 1.0 mg/l for November through March. No change is being made to this limit, and it is not subject to re-opened comment.

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V. State Certification Requirements

The staff of the Massachusetts Department of Environmental Protection has reviewed the partially revised draft permit. EPA has requested permit certification by the State pursuant to CWA § 401(a)(1) and 40 CFR § 124.53 and expects that the draft permit, as revised, will be certified.

VI. Public Comment Period, Public Hearing, and Procedures for Final Decision

All persons, including applicants, who believe the revised seasonal phosphorus limit of the new draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full before the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection "CMP", Region 1, 1 Congress Street, Suite 1100, Boston, MA 02114-2023. Any person, prior to such date, may submit a request in writing to EPA and the state agency for a public hearing to consider the revised seasonal phosphorus limit of the draft permit. Such requests shall state the nature of the issues proposed to be raised in the hearing.

A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office. Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Permits may be appealed to the Environmental Appeals Board in the manner described at 40 CFR § 124.19.

VII. EPA and MassDEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

David Pincumbe
Municipal Permits Branch (CMP)
Office Of Ecosystem Protection
US Environmental Protection Agency
Congress Street, Suite 1100
Boston, MA 02114-2023
Tele: (617) 918-1695

Paul Hogan, Chief
Surface Water Permit Program
Division of Watershed Management
Department of Environmental Protection
627 Main Street, Second Floor
Worcester, MA 01608
Tele: (508) 767-2796

July , 2007
Date

Stephen Perkins, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

City of Attleboro, Massachusetts Response To Comments

On August 16, 2006, the U.S. Environmental Protection Agency-Region 1 ("EPA") and the Massachusetts Department of Environmental Protection ("MassDEP") released for public comment a draft National Pollutant Discharge Elimination System ("NPDES") permit (No. MA0100595) for discharges of treated wastewater effluent from the City of Attleboro Water Pollution Control Facility ("WCPF") to the Ten Mile River in Massachusetts.

EPA received comments from the City of Attleboro ("City"), including from Anderson and Kreiger, LLP and Camp Dresser McKee ("CDM") on the City's behalf; the Rhode Island Department of Environmental Management ("RIDEM"); and the Massachusetts Riverways Program.

As a result of comments received from RIDEM, EPA proposed a revision to the draft permit's monthly average total phosphorus limit of 0.2 mg/l (effective April through October). EPA determined that a revision of the limit from 0.2 mg/l to 0.1 mg/l was necessary to assure that applicable water quality standards in Massachusetts and Rhode Island will be met. On August 1, 2007, EPA released a new draft permit reflecting this change for public notice and comment. EPA received additional comments on the modification from Anderson and Kreiger, CDM, NewStream LLC, and Riverways.

The following are responses to all comments received during the two public comment periods and descriptions of any changes made to the public-noticed permit and modification as a result of those comments.

MassDEP has issued a water quality certification pursuant to Section 401(a) of the Clean Water Act ("CWA"). While concluding that the conditions of the permit would achieve compliance with the CWA and the Massachusetts Clean Waters Act, the certification letter also included commentary on the technical, legal and policy rationales for draft permit's nutrients limits and specifically requested the inclusion of a compliance schedule to achieve the permit's total phosphorus limit of 0.1 mg/l. The issues raised by MassDEP in its certification letter are addressed at the end of this document under the heading "Section 401 Certification."

A copy of the final permit may be obtained by writing or calling David Pincumbe, United States Environmental Protection Agency, 1 Congress Street, Suite 1100 (CMP), Boston, Massachusetts 02114-2023; Telephone (617) 918-1695. Copies may also be obtained from the EPA Region 1 web site at http://www.epa.gov/region1/npdes/index.html.

The following comments were received from Anderson and Kreiger, on behalf of the City, in a letter dated September 14, 2006:

Comment #A.1: The Massachusetts Department of Environmental Protection (MassDEP) has not imposed the total nitrogen limit contained in the proposed permit. See Draft Permit, pp. 2, 4 and n. 9 ("This permit limit is a requirement of the U.S. Environmental Protection Agency (EPA) permit and is not a requirement of the Massachusetts Department of Environmental Protection (MassDEP) permit. . . ."). This permit is, as far as we know, the first instance where EPA has proposed stricter nitrogen limits upon a Massachusetts discharger than imposed by Massachusetts itself. This raises legal and policy issues arising from the interstate nature of the analysis.

The problem is exacerbated by the absence of total maximum daily load (TMDL) calculations or other reliable data supporting the downstream state's position here. EPA's draft permit ultimately rests upon an approach that the Clean Water Act (CWA) attempted to avoid, that Massachusetts regulators contest, and that science cannot justify. This raises additional legal, factual and policy issues under the CWA.

The City's first concern is that the total nitrogen limits are unwarranted as a scientific matter. To accept the Rhode Island Department of Environmental Management's (RIDEM) rationale in this case would establish an extremely unfortunate precedent for reliance upon unproven "science" and speculation.[1]

The CWA contemplated solid scientific support for imposing site-specific effluent limits upon publicly owned treatment works, with corresponding burdens upon ratepayers and taxpayers. Section 303(d) (33 U.S.C. § 1313(d)); 40 C.F.R. 130.7. Rhode Island was supposed to establish TMDLs for the receiving waters "at a level necessary to implement the applicable water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality." *Id.*

RIDEM frankly acknowledges that it has been unable to develop a water quality model and a water quality restoration plan for the Providence and Seekonk Rivers. See "Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers", RIDEM, Office of Water Resources, December 2004 (Appendix, Tab 1) ("RIDEM 2004 Evaluation"):

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[1] Requiring expenditures by Attleboro based upon this state of scientific knowledge is particularly ironic, where RIDEM has declined to devote resources needed to develop a water quality model and other predictive tools until a technical advisory committee recommends the most promising approach. RIDEM, Nutrient Permit Modifications – Response to Comments, pp. 16, 22, 29, included in Appendix, Tab 3. Meanwhile, municipalities including Attleboro are forced to expend resources in facilities upgrades without even knowing what the final requirements will look like and what cost savings might have been achieved if those final requirements had been known prior to committing those resources – precisely what RIDEM itself refuses to do.

> It has recently been determined that due to problems encountered when modeling the interaction between the deep channel and shallow flanks of these water bodies, the mass transport component of the model system cannot be successfully calibrated and validated . . . Because water doesn't mix in the model as it does in the rivers, we are unable to simulate the chemical and biological behavior of the system in the water quality phase of the modeling effort.
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> Our inability to adequately validate the mass transport model also prevents us from applying the Massachusetts approach to setting load allocations that uses ambient total nitrogen concentration as the indicator, which is described below.

Id., p. 1. See also RIDEM "2004 CWA § 303(d) List of Impaired Waters" [listing Ten Mile River as group 2: "(TMDL Planned)"; the target date is 2008]. Instead, RIDEM relies upon an experiment, conducted between May 1981 and September 1983 in a static laboratory system (consisting of nine tanks at the University of Rhode Island) by the Marine Ecosystems Research laboratory (MERL), which sampled chlorophyll-a, dissolved oxygen and – tellingly – DIN (dissolved inorganic nitrogen), rather than total nitrogen. *Id.* The problems with applying that experiment to the dynamic rivers and embayment systems at issue here go even beyond the obvious differences between a laboratory and a complex real-world system.[2]

CDM has identified many reasons why the RIDEM 2004 Evaluation fails to establish a scientific basis for imposing limits upon Attleboro that Massachusetts has not imposed. See CDM report, attached hereto as Exhibit A. It has also pointed out that there are many potential causes of low dissolved oxygen, beyond wastewater plant effluent.

MassDEP has also documented the uncertainties and inadequacies of the existing scientific knowledge, if used for permitting purposes. It did so in a letter dated February 11, 2004, and then in its February 8, 2005, review comments on RIDEM permits and supporting documents including the RIDEM 2004 Evaluation. See Appendix, Tab 2. Many of MassDEP's comments have gone unanswered. Its insistence upon solid science has not been effectively rebutted. It is probably no

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[2] Even as it states the belief "that the MERL tank results provide an adequate representation of the relationship between nitrogen and oxygen levels in the Providence and Seekonk Rivers" the RIDEM 2004 Evaluation, p. 27, concedes that "some uncertainty remains regarding predicted water quality improvements and loading reductions necessary to meet water quality standards. As noted above, significantly lower mean DIN concentrations were observed in the Providence and Seekonk Rivers as compared to the MERL experiment for an equivalent loading rate, which may be the result of large differences between the field and experimental flushing times, uptake by macroalgae and denitrification in the bottom waters."

coincidence that MassDEP, which can apply water quality models, comes up with a different answer.

RIDEM was operating under a state legislative mandate to reduce nitrogen discharges by 50% by December 31, 2008. RIDEM, Nutrient Permit Modifications – Response to Comments, pp. 1, 3, citing RI Gen. Laws. § 46-12-2(f), Appendix, Tab 3. See also RIDEM "Plan for Managing Nutrient Loadings to Rhode Island Waters" (Feb. 1, 2005), Appendix, Tab 8. That mandate is a blanket reduction applicable to in-state facilities, not an applicable water quality standard, within the meaning of federal law. RIDEM has (understandably) acted upon this mandate (id.), which does not apply to Attleboro and can not be applied by EPA here. It would be error to require Attleboro to comply with RI Gen. Laws. § 64-12-2(f), but the draft permit would do just that (and more), because it derives from RIDEM's implementation of that statute. It is not a fair answer to assert (again without reliable scientific support) that "EPA has concluded that the amount of nitrogen reduction will be at least as great as required by the proposed permit level." See Fact Sheet, p. 11. EPA should not require public investment based upon uncertain science that easily may turn out to be superseded by the time the required construction is designed or even completed, requiring still more investment, a changed course of action and imposition of charges or taxes. Of course, if future science (or even the current facts cited by CDM) demonstrates that EPA has overstated the contribution of the Attleboro plant to low oxygen levels or other conditions, then the situation would be even worse.

Ultimately, RIDEM's selection of limits is not based upon science, let alone a TMDL. In its search for guidance from EPA, it has used the criteria that apply "if there are not adequate data and predictive tools to characterize and analyze the pollution problem ....". RIDEM 2004 Evaluation, Appendix, tab 1. This is essentially a correct admission about the lack of scientific support for RIDEM's approach – an approach that, as shown below, even RIDEM does not intend to implement for years, if ever. To be sure, the EPA guidance acknowledges that a "phased approach may be necessary", but RIDEM consciously delayed its modeling (see FN1, above) and then based its 2004 Evaluation upon implementation costs of certain approaches and the supposed water quality benefit that it presumes would result despite the lack of adequate data and predictive tools. On the supposed basis of cost-effectiveness, it selects 5 mg/l for four WWTPs and 8 mg/l for the others (including out-of-state plants), regardless of actual contribution to Rhode Island waters.[3] This is therefore **not a decision about relative contributions to problems within Rhode Island waters,** but,

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[3] It rejected a suggestion to evaluate Massachusetts contributions after current upgrades are in place, but, in doing so, discussed only the Upper Blackstone facility – a red herring as far as Attleboro's ongoing upgrade is concerned. Moreover, by applying the same 8 mg/l limit to Rhode Island and Massachusetts facilities, it failed to account for the observation (RIDEM 2004 evaluation, p. 19) that "[i]n the Ten Mile river, the DIN discharge to the Seekonk River was found to be 61% of the concurrent load estimate from the Attleborough and North Attleborough WWTFs using 1995-1996 flows."

instead, is a crude means to postpone TMDLs and treat different discharges the same, regardless of location and attenuation before reaching affected waters.

Response #A.1: Section 301(a) of the CWA prohibits the discharge of any pollutant into a navigable body of water unless the point source has obtained an NPDES permit. Section 402 establishes the NPDES permitting regime, and describes two types of permitting systems: state permit programs that must satisfy federal requirements and be approved by the EPA, and a federal program administered by the EPA. As the Commonwealth of Massachusetts has never obtained authorization from EPA to administer the federal NPDES program, EPA is responsible for development and issuance of NPDES permits to point sources in Massachusetts. While the State of Rhode Island has sought and obtained such authority from EPA, Rhode Island's authority to issue NPDES permits pertains to discharges into navigable waters in its jurisdiction. *See* CWA § 402(b). In this matter, EPA, not Massachusetts or Rhode Island, is responsible for development and issuance of an NPDES permit that meets all applicable requirements of the CWA and EPA's regulations.

The Act and EPA's regulations require EPA to condition any permit to ensure compliance with applicable water quality standards of the state where the discharge originates *and* the standards of any downstream affected state. Pursuant to section 301(b)(1)(C) of the CWA, a permit must, among other things, contain limitations necessary to achieve water quality standards established by a state and approved by EPA pursuant to section 303 of the CWA. Limitations must control all pollutants and pollutant parameters that can be shown will cause, have the reasonable potential to cause, or will contribute to an excursion above numeric or narrative state water quality criteria. Section 401(a)(2) of the CWA and 40 C.F.R. § 122.44(d)(4) explicitly direct EPA to consider the views of a downstream state concerning whether a discharge would result in violations of the state's water quality standards. If EPA agrees a discharge would cause or contribute to such violations, EPA must condition the permit to ensure compliance with those standards.[4] *See also* 40 C.F.R. § 122.4(d) (prohibiting issuance of an NPDES permit "[w]hen the imposition of conditions cannot ensure compliance with applicable water quality requirements of all affected States").

Neither the CWA nor EPA regulations require that a TMDL be completed before a water quality-based limit may be included in an NPDES permit. Rather, water quality- based effluent limitations in NPDES permits must be "consistent with the assumptions and requirements of any *available* [emphasis added] wasteload

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[4] Although EPA administers the NPDES program, Massachusetts maintains separate, independent water pollution control permitting authority under state law. *See* Mass. Gen. Laws Ann. Ch. 21, § 43. EPA and the Commonwealth typically coordinate their respective permitting efforts; when the Region issues an NPDES permit in Massachusetts, MassDEP typically issues a permit pursuant to state law. Although these permits are often identical, there is no legal requirement for them to be the same. Unlike an NPDES permit, a Massachusetts surface water discharge permit is not required to comply with the water quality standards of downstream states.

allocation." 40 C.F.R. § 122.44(d)(1)(vii)(B). Thus, an approved TMDL is not a precondition to the issuance of an NPDES permit for discharges to an impaired waterway. This interpretation is consistent with the preamble to 40 C.F.R. § 122.44(d)(1), which expressly outlines the relationship between subsections 122.44(d)(1)(vi) (*i.e.*, procedures for implementing narrative criteria), and (d)(1)(vii):

> The final point about paragraph (vi) is that in the majority of cases where paragraph (vi) applies waste load allocations and total maximum daily loads will not be available for the pollutant of concern. Nonetheless, any effluent limit derived under paragraph (vi) must satisfy the requirements of paragraph (vii). Paragraph (vii) requires that all water quality-based effluent limitations comply with "appropriate water quality standards," and be consistent with "available" waste load allocations. Thus for the purposes of complying with paragraph (vii), where a wasteload allocation is unavailable, effluent limits derived under paragraph (vi) must comply with narrative water quality criteria and other applicable water quality standards.

See 54 Fed. Reg. 23,868, 23,876 (June 2, 1989). If a TMDL is completed and approved by EPA, the effluent limitation in any subsequently issued NPDES permit must be consistent with the wasteload allocation assigned to the Attleboro facility. In the meantime, relevant regulations *require* that EPA include an effluent limit for any pollutants which EPA determines "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality." 40 C.F.R. § 122.44(d)(1)(i).

The nitrogen limit in this permit is based upon an application of the requirements of the federal CWA and has been imposed to meet Rhode Island's water quality standards.[5] Rhode Island, like most states, has not yet developed statewide numeric total nitrogen criteria or numeric response variable criteria, nor has

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[5] The Attleboro WPCF discharges to the Ten Mile River about 200 yards from the Rhode Island border. *See* Attachment 1. The nitrogen limit is not required to meet Massachusetts' water quality standards, because the portions of the Ten Mile River within Massachusetts that receive nitrogen effluent discharges from the Attleboro facility are comprised of freshwater. Phosphorus is the limiting nutrient for the purposes of cultural eutrophication in freshwater systems, while nitrogen plays that role in marine systems. Both the NPDES permit and the Massachusetts state permit contain identical phosphorus effluent limits to address cultural eutrophication in this stretch of the Ten Mile River. After crossing the Massachusetts/Rhode Island border at Pawtucket, the Ten Mile River continues through East Providence, and ultimately discharges to the Seekonk River about 8 miles downstream of the Attleboro discharge. The Seekonk River is a marine water, where nitrogen impacts pose the primary threat to water quality and are required to be controlled to ensure compliance with Rhode Island water quality standards. Rhode Island has listed the Seekonk River as impaired for nutrients, low dissolved oxygen and excess algal growth/chlorophyll *a*. The Seekonk River joins the Providence River, which ultimately discharges into Narragansett Bay.

Rhode Island developed site-specific numeric criteria for total nitrogen or response variables for Narragansett Bay. Until such numeric criteria values are available, EPA must base effluent limits on its interpretation of the narrative criteria in the currently approved water quality standards. *See* Rhode Island Water Quality Regulations, Rule 8(D)(1)(d) and Table 2, Rule 8(D)(3)(10). Water quality-based effluent limits imposed through NPDES permits must ensure that all components of water quality standards are achieved. *See* CWA § 301(b)(1)(C); 40 C.F.R. §§ 122.4(d), 122.44(d)(1).

EPA has determined that discharges of nitrogen from the Attleboro WPCF cause or contribute to violations of Rhode Island's water quality standard for nitrogen. The Seekonk River is listed on the Rhode Island's 2004 and 2006 CWA § 303(d) Lists of Impaired Waters as a water impaired due to excess nutrients, low dissolved oxygen, and excess algal growth/chlorophyll *a*. The need for nitrogen limits is based on an extensive amount of water quality/use impairment data and scientific knowledge regarding the environmental impacts of excessive nitrogen loadings on the receiving waters. For many years, it has been recognized that Rhode Island and Massachusetts municipal wastewater treatment facilities are a significant source of nutrients to the Seekonk River, Providence River and Upper Bay. *See, e.g., Plan for Managing Nutrient Loadings to Rhode Island Waters*, RIDEM, February 1, 2005; *Governor's Narragansett Bay and Watershed Planning Commission, Nutrient and Bacteria Pollution Panel, Initial Report*, March 2, 2004 at page 3 (summarizing studies). In addition, certain facilities (including Attleboro) discharge to the most impaired reaches at the head of Upper Narragansett Bay. *2005 RIDEM Report* at page 3.

In this case, neither a dynamic water quality model nor a TMDL was available to EPA, and neither is expected to be available in the foreseeable future. Since 1995, RIDEM has expended significant resources in an attempt to simulate this complex ecosystem through the use of mathematical models. Some of these efforts are summarized in the 2005 RIDEM Report. Several unsuccessful attempts at dynamically modeling this system have resulted in the conclusion that the system is too complicated to simulate with available mathematical models.

When imposing an effluent limit on a particular point source in order to implement a narrative water quality criterion, EPA is not required to have a TMDL, a dynamic water quality model, or comparable analysis that comprehensively allocates loads to all point and nonpoint pollutant sources that are contributing to an impairment. Instead, when calculating a numeric permit limit to achieve a narrative criterion, EPA is directed (in relevant part) to use one or more of the following methodologies:

> (A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. Such a criterion may be derived

using a proposed State criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or

(B) Establish effluent limits on a case-by-case basis, using EPA's water quality criteria, published under section 304(a) of the CWA, supplemented where necessary by other relevant information[.]

40 C.F.R. §§ 122.44(d)(1)(vi)(A), (B). EPA is clearly authorized, even in technically and scientifically complex cases, to base its permitting decision on a wide range of relevant material, including EPA technical guidance, state laws and policies applicable to the narrative water quality criterion, and site-specific studies. Nothing in the foregoing regulation, or its preamble, suggests that EPA is required to await the completion of approved TMDLs or dynamic water quality models as predicates to imposing a water quality-based effluent limit.[6]

In the absence of a dynamic model or TMDL, EPA relied on the best information reasonably available to it to establish the permit limit for nitrogen. The agency considered more than 15 years of water quality data, studies and reports evaluating nitrogen levels and response variables in Narragansett Bay. These materials included EPA's *Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters* (EPA, October 2001) and a variety of site-specific reports commissioned by Rhode Island to address nitrogen loading and control the effects of cultural eutrophication in the receiving waters. *See, e.g., Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* (December 2004); *Plan for Managing Nutrient Loadings to Rhode Island Waters* (RI-DEM, February 1, 2005); *Nutrient and Bacteria Pollution Panel – Initial Report* (Governor's Narragansett Bay and Watershed Planning Commission, March 3, 2004); and *Massachusetts Estuaries Project –*

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[6] In keeping with the regulation, EPA does not believe that any one source of information should necessarily be given definitive weight, nor does it believe that the absence of a particular information source should necessarily preclude EPA from establishing an effluent limit. The approach of utilizing available guidance and materials generated by the EPA and States, as supplemented by other information reasonably available at the time of permit reissuance, makes sense in light of federal regulations requiring EPA to include requirements that will achieve state water quality standards when reissuing a permit and prohibiting issuance of a permit when the imposition of conditions cannot ensure compliance with the applicable state water quality requirements of all affected States. *See* 40 C.F.R. §§ 122.4(d), 122.44(d)(1). The alternative proposed by the commenter—to forego imposition of permit limits that would mitigate water quality impacts while awaiting complex TMDLs and dynamic mathematical models that may take years to complete, if competed at all—would forestall water quality improvements and would be inconsistent with EPA's regulatory obligations. Although the commenter regards this overall approach as flawed and argues that EPA should have waited to act until more definitive and comprehensive analyses became available, EPA disagrees and believes its reliance on the regulations and the best technical and scientific material reasonably available at the time of reissuance is reasonable.

Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators, July 21, 2003 as revised).

In addition, EPA relied on the results of a physical water quality model operated by the Marine Ecosystems Research Laboratory (MERL) at the University of Rhode Island that was designed to predict the relationship between nitrogen loading and several trophic response variables in the Narragansett Bay system. In establishing the nitrogen limit in this permit, and evaluating the MERL model, EPA also considered actual measurements of nitrogen loadings from point source discharges, including a 1995-96 study by RIDEM Water Resources.

The City criticizes EPA's reliance on a physical model in lieu of a mathematical model. EPA, however, determined that reliance on this model was reasonable. In light of the extreme technical difficulty of constructing an accurate fate and transport model that would allow EPA to predict with certainty the precise downstream impacts of nitrogen loading from the facility, EPA turned to the simplifying ground rules and assumptions reflected in the MERL model to guide and rationalize its decision making.[7] In addition, EPA's guidance document *Nutrient Criteria Technical Guidance Manual, Estuarine and Coastal Marine Waters* cites the MERL experiments as compelling evidence that nitrogen criteria are necessary to control enrichment of estuaries. Specifically, the guidance states:

> "Three case studies provide some of the strongest evidence available that water quality managers should focus on N for criteria development and environmental control (see NRC 2000 for details). One study involves work in large mesocosms by the University of Rhode Island (Marine Ecosystem Research Laboratory–MERL) on the shore of Narragansett Bay. Experiments showed that P addition was not stimulatory, but N or N+P caused large increases in the rate of net primary production and phytoplankton standing crops. (Oviatt et al. 1995)."

In arriving at its determination to rely on the MERL model, EPA also considered the need to expeditiously address the severe existing nitrogen-driven cultural eutrophication in the receiving waters. In the time that RIDEM has been attempting to develop a dynamic model, the Seekonk/Providence River system and waters downstream have continued to suffer from the effects of severe cultural eutrophication, so EPA could not justify further delaying the permitting process on the chance that a numerical model would be forthcoming.[8] Moreover, the tendency for nitrogen to not only exacerbate existing water quality impairments but to persist in the environment in a way that contributes to future water quality problems counsels in favor of imposing such a limit on Attleboro's discharge based on information currently available to EPA. Finally, EPA notes

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[7] RIDEM has also embraced the model as a basis to impose permit limits on Rhode Island facilities to control the effects of cultural eutrophication.

[8] These adverse affects have included fish kills (see www.dem.ri.gov/bart/fishkill.htm).

that the permit was last issued to the facility in 1999, has expired, and has been administratively continued for several years.

The MERL enrichment gradient experiment included a study of the impact of different loadings of nutrients on dissolved oxygen and chlorophyll *a*. *See Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RIDEM, December 2004. The MERL enrichment gradient experiments were conducted from June 1981 through September 1983 and consisted of 9 tanks (mesocosms), each 5 meters deep and 1.83 meters in diameter. Three tanks were used as controls, and were designed to have regimes of temperature, mixing, turnover, and light similar to a relatively clean Northeast estuary with no major sewage inputs. The remaining six mesocosms had the same regimes, but were fed reagent grade inorganic nutrients (nitrogen, phosphorus and silica) in molar ratios found in Providence River sewage. The six mesocosms were fed nutrients in multiples of the estimated average sewage inorganic effluent nutrient loading to Narragansett Bay. For example the 1X mesocosm nitrogen loading was 2.88 mM N/m ^{2}/day (40 mg/ m ^{2} /day) and the 2X was twice that and so on (4X, 8X, 16X) up to the a maximum load of 32X. During the study dissolved oxygen, chlorophyll, pH, and dissolved inorganic nutrients were measured in the water column and benthic respiration was also measured. From the collected data the investigators produced times series for oxygen, pH, temperature, nutrients, chlorophyll, and system metabolism (see *Patterns of productivity during eutrophication: a mesocosm experiment*, Oviatt, Keller, Sampou, Beatty).

Both the MERL tank experiments and the data from the Providence/Seekonk River system indicate a clear correlation between nitrogen loadings, dissolved oxygen impairment and chlorophyll *a* levels. Low dissolved oxygen levels, as well as supersaturated dissolved oxygen levels, are indicators of cultural eutrophication. Figures 1 through 3 in the *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* show the dissolved oxygen measurements taken from MERL tank experiment and demonstrate that the range and variability of DO increases with increased nutrient loading. As described in the text of the report, and shown in Figure 13, the DO in the Seekonk River showed patterns of DO variability similar to that of the high enrichment tanks in the MERL experiments.

Phytoplankton, as measured by chlorophyll *a* levels, is an even stronger response indicator of cultural eutrophication than DO. Coastal areas without high nutrient loads are expected to have chlorophyll *a* levels in the 1 to 3 ug/l range (*Nutrient Criteria Technical Guidance Manual – Estuarine and Coastal Marine Waters*, USEPA, October 2001). Massachusetts has identified chlorophyll *a* levels of less than 3 ug/l as representing excellent water quality and chlorophyll *a* levels similar to the levels in the Providence/Seekonk River system as representing significantly impaired waters (*Massachusetts Estuaries Project – Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical*

Indicators, July 21, 2003 as revised). Peak chlorophyll *a* levels in the Providence/Seekonk River system have exceeded 200 ug/l (see June 29th data in Figure 15 of *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*). The MERL tank experiments showed a correlation between nitrogen loading rates and chlorophyll *a* levels (see Figures 7, 8, and 9). These results were consistent with RIDEM data from 1995-96, which indicate that mean photoplankton chlorophyll *a* levels in the three Seekonk River monitoring stations ranged from 14 ug/l to 28 ug/l, with the highest levels in the upper reaches of the river and the lowest levels in the lower reaches of the river (see Table 3). These chlorophyll *a* levels correlate with total nitrogen levels and with the dissolved inorganic nitrogen levels shown in Figure 3.

The basic relationship demonstrated by the MERL tank experiments between the primary causal and response variables relative to eutrophication corresponds to what is actually occurring in the Providence/Seekonk River system.[9] EPA recognized, however, that the MERL tank experiments cannot completely simulate the response of chlorophyll *a* and dissolved oxygen to nitrogen loadings in a complex, natural setting such as the Providence/Seekonk River system, and thus does not yield a precise level of nitrogen control required to restore uses in the system. For example, dissolved oxygen in Narragansett Bay is influenced by stratification, which was not simulated in the MERL tank experiment, in which waters were routinely mixed. In a stratified system there is little vertical mixing of water, so sediment oxygen deficits are exacerbated due to the lack of mixing with higher DO waters above. In addition, the flushing rate used in the MERL tanks is not the same as seen in the Bay. The model's lack of stratification could result in it being significantly less conservative than the natural environment. On the other hand, the failure of the model to mirror the flushing rates in Narragansett Bay could render it overly conservative when compared to natural conditions, but to what degree is unclear. Because the physical model does not generate a definitive level of nitrogen control that can be applied to a real world discharge, but instead a range of loading scenarios which are subject to some scientific uncertainty, EPA was required to exercise its technical expertise and scientific judgment based on the available evidence when translating these laboratory results and establishing the permit limit.

Of the various loadings scenarios available to it, EPA determined that a concentration-based limit of 8 mg/l would be necessary to address the excessive loadings from the facility, which both EPA and Rhode Island have determined are contributing to ongoing water quality impairments in the Narragansett Bay system. An effluent limit of 8 mg/l corresponds to a loading scenario in the Seekonk River of approximately 6.5X at current facility flows and 10X at 90% design flows. *See* Evaluation of Nitrogen Target and WWTF Load Reductions for the Providence and Seekonk Rivers, RIDEM, December 2004 at 28. *See also*

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[9] The correlation between nitrogen loadings, chlorophyll *a* levels, and dissolved oxygen impairment is well documented in the *Nutrient Criteria Technical Guidance Manual – Estuarine and Coastal Marine Waters*, USEPA, October 2001.

Attachment 12. Despite the severe nitrogen-related impairments in the receiving waters, EPA opted not to impose a limit based on more stringent loading scenarios at this time in order to account for uncertainties associated with the physical model. (Based on the MERL tank experiments, a nitrogen loading of between 2 times and 4 times the Bay wide loading may be necessary to achieve water quality standards). Even with the recognition of differences between the laboratory and natural environment, the fact that water quality responses to a 10X nitrogen mass loading scenario in the MERL tank experiments resulted in a significant level of impairment was an area of concern for EPA in light of its duty under section 301(b)(1)(C) to ensure compliance with water quality standards. However, when evaluating the adequacy of the limit, EPA was also aware that the particular approach it adopted possesses conservative elements which enhance the protectiveness of the permit beyond that of the 10X mass loading scenario. Specifically, the decision by EPA to impose concentration rather than mass limits will assure that effluent nitrogen concentrations are maintained at consistently low levels and, as a practical matter, will result in actual mass loadings that are kept significantly below the 10X loading scenario for the foreseeable future, as treatment plant flows remain well below the facility's design flow of 8.6 MGD.[10]

When establishing the limit and assessing its protectiveness, EPA took into account the fact that RIDEM has committed to ensuring adequate monitoring and assessment of water quality changes to determine if additional reductions will be necessary to meet water quality standards. RIDEM has, in partnership with several research and academic institutions in Rhode Island, established an extensive monitoring network in order to provide the data necessary to evaluate compliance with water quality standards upon implementation of the recommended nitrogen reductions (*see* RIDEM, February 1, 2005 report). This information will be available to check the Region's assumptions regarding the adequacy of the limit. If EPA has erred in navigating the scientific complexities and uncertainties associated with the MERL tank experiments, EPA will be able to further refine the limit in future permitting cycles.

When evaluating whether it had met its obligations under section 301(b)(1)(C) and 401(a)(2) to ensure compliance with applicable water quality standards, including those of affected states, EPA also accounted for the fact that Rhode Island, when assigning permit limits to facilities within its own borders in accordance with its own water quality standards, did not conclude more stringent limits would be necessary or appropriate at this time. Under Rhode Island's permitting approach, limits of 8 mg/l and 5 mg/l have been imposed on various Rhode Island POTWs whose discharges impact Narragansett Bay, and Rhode Island has recommended that similar limits be placed on certain Massachusetts facilities that are impacting the Bay. *See Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RI DEM,

[10] Treatment facility flows have been generally stable in recent years. Annual average flow was 4.7 MGD for 1997, 5.0 MGD for 2000, 5.0 MGD for 2001, 5.0 MGD for 2002, 5.8 MGD for 2003, 4.6 MGD for 2004, 3.3 MGD for 2005, 3.4 MGD for 2006 and 4.2 MGD for 2007.

December 2004. In arriving at its decision to impose nitrogen effluent limit of 8 mg/l on the Attleboro WPCF, EPA regarded Rhode Island's position as additional evidence that the limit was reasonable and sufficiently stringent to comply with the CWA.

EPA in addition determined that no less stringent limit could be imposed that would still ensure compliance with water quality standards in light of the severe existing eutrophic conditions in the Providence/Seekonk River system, indicating that it is significantly overallocated for nitrogen. In so concluding, EPA also weighed the fact that RIDEM has indicated that nitrogen limits as low as the limits of technology (*i.e.*, 3 mg/l) may be necessary to achieve water quality standards, with the caveat that it too has acknowledged uncertainty in the model. *See Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RIDEM, December 2004, at p. 27. [11]

Contrary to the commenter's suggestion, in establishing the nitrogen limit, EPA did take into account specifics regarding Attleboro's discharge, including the location of its discharge and its relative contribution to the Seekonk River system, in developing the limits. Both EPA and RIDEM have established or proposed nitrogen limits of 5.0 mg/l for facilities contributing the largest amount of nitrogen to the upper reaches of the Seekonk River system, where the greatest level of impairment has been documented. These include one facility in Massachusetts (Upper Blackstone Water Pollution Abatement District, currently proposed in draft) and two facilities in Rhode Island.[12] To show the relative contribution of POTW discharges to the Seekonk River, EPA calculated the total DIN load to the River using the effluent DIN limits recommended by RIDEM technical evaluation and EPA. The calculations were made using 90 percent of the POTWs' design flows and the suggested permit concentration limits. The resulting loads were then calculated under two scenarios, one assuming no attenuation and the other using the attenuation rates calculated by RIDEM (13 percent for Blackstone River dischargers and 40 percent for the Ten Mile River discharges). *See* Attachment 11. Under the no-attenuation scenario, Attleboro's load would be roughly equal to Woonsocket's, due to Attleboro's higher proposed

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[11] In general, the Region adopts a reasonably conservative approach when permitting nutrient discharges. This protective approach is appropriate because, once begun, the cycle of eutrophication can be difficult to reverse given the tendency of nutrients to recycle through the ecosystem. This approach is in line with EPA regulations. The Region is required to impose a limit where the reasonable *potential* exists for violations of water quality standards. *See* 40 C.F.R. § 122.44(d)(1),(5). Moreover, such a limit must *ensure* compliance with water quality standards. This approach is also consistent with EPA nutrient guidance. For example, in the context of section 303(d) listing decisions, EPA's 2001 Nutrient Criteria Development Memorandum, recommends (at p. 19) that listing should "ideally occur prior to highly visible responses such as algal blooms to facilitate a more proactive approach to management[,]" and states should "consider excessive levels of nitrogen and phosphorus as a basis for listing regardless of the status of early response variables such as chlorophyll *a* or turbidity."

[12] All of the Rhode Island facilities receiving a limit of 8.0 mg/l discharge either into the Providence River, downstream of the Ten Mile confluence or in the lower Bay, where the flushing rate is higher and the impacts less severe.

limit, even though Woonsocket has a much higher design flow, with each discharge representing about 12 percent of the total loading POTW loading to the Seekonk River. Using attenuation, Attleboro's contribution to the total load falls to 9 percent with Woonsocket's increasing to 13 percent, given the different attenuation rates. As we have discussed previously, we expect the attenuation in the Ten Mile River to decrease as the phosphorus-driven algae growth decreases in the future.

While the Attleboro facility discharges into the area experiencing the greatest impairment (Seekonk River), it is a smaller facility than the three facilities with 5 mg/l limits referred to above, and therefore EPA has imposed a less stringent limit on it, which has resulted in having the same relative loading as the Woonsocket facility (before accounting for attenuation), which has a design flow about twice Attleboro's.

The City understandably expresses concern about the need to expend resources for facilities upgrades without knowing whether future permit limits will be different. This is in part a function of the NPDES permitting program, which requires EPA to reassess permit limits and water quality conditions based on information available at the time of permit reissuance. While the cost to implement treatment is not one of the factors set forth in the CWA or EPA's regulations related to the establishment of water quality-based effluent limits, EPA appreciates and acknowledges the City's concerns. The current limit of 8 mg/l is readily achievable with existing technology (see *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers*, RI DEM, December 2004 and Chesapeake Bay Program website (http://www.chesapeakebay.net/ecoanalyses.htm). It is EPA's judgment that future limits will not be less stringent than 8 mg/l total nitrogen. Should more stringent limits ultimately be needed after assessing the receiving water response to the proposed load reductions, additional nitrogen removal technologies can be added to the technology implemented to meet the limit in this permit. This should minimize any potential for the permittee to expend funds unnecessarily. In addition, EPA anticipates establishing a reasonable schedule in a separate administrative order for design and implementation of treatment necessary to meet the new permit limits. As is our usual practice, EPA will consult with the City in development of that schedule.

EPA did not base its permit limit on Chapter 46-12 of the RI General Laws. The City incorrectly suggests, however, that EPA should not in development of effluent limits for this permit consider water quality reports and studies generated by RIDEM in connection with that law related to restoring uses in the Narragansett Bay system. While EPA recognizes its independent obligation to establish protective permit limits, it is fully appropriate for EPA to consider the technical reports generated by RIDEM in development of the nitrogen limits for this permit. As noted above, the CWA explicitly directs EPA to consider the

views of a downstream state concerning whether a discharge would result in violations of the state's water quality requirements.

In its comment above, the City generally references comments prepared by its consultant, CDM, that relate to the 2004 RIDEM Evaluation. The City also appends to its comments a letter dated September 13, 2006, from CDM. Finally, the City indicates that CDM has pointed out many potential causes of low dissolved oxygen in addition to wastewater plant effluent. EPA addresses the comments offered by CDM and reflected in CDM's September 13, 2006 letter in section B below.

The City also references and appends comments from MassDEP submitted to RIDEM during the public notice period on four permits issued by RIDEM – Fields Point, Bucklin Point, Woonsocket and East Providence WWTFs. (It appears that MassDEP's letter was incorrectly dated February 11, 2004 instead of February 11, 2005. The "February 11, 2004" letter includes an attachment dated February 8, 2005.) The City also appends to its comments RIDEM's responses to MassDEP. The City generally notes that "[m]any of MassDEP's comments have gone unanswered" and that MassDEP "comes up with a different answer." The City does not, however, specify which comments it believes were incompletely addressed by RIDEM and how the failure to address these issues specifically relates to the Attleboro permit. EPA cannot therefore offer a meaningful response.

Comment #A.2: The interstate nature of the problem exacerbates the scientific, policy and legal difficulties. EPA contemplates the highly unusual step of promulgating a nitrogen limitation for a Massachusetts facility that MassDEP has declined to impose. There is no total nitrogen limits issue here under Section 401(a)(1) [33 U.S.C. § 1341(a)(1)] of the Clean Water Act, as Massachusetts has not required those limits to comply with the water quality standards of the state where Attleboro's discharge originates.

The total nitrogen limits therefore must be justified, if at all, under Section 401(a)(2) [33 U.S.C. § 1341(a)(2)] and 40 C.F.R. § 122.44(d), relating to conditions in NPDES permits that will ensure compliance with the "applicable water quality requirements" of a "downstream affected state", namely Rhode Island. By now, such standards should be reflected in TMDLs. As a downstream state, Rhode Island has no authority to regulate the Massachusetts waters where the Attleboro plant discharges; the only question concerns the effect of the Massachusetts discharge once it reaches affected Rhode Island waters. See Arkansas v. Oklahoma, 503 U.S. 91 (1992) (downstream state's water quality standards are not applicable where any pollutants in the upstream discharge are not detectable at and within the downstream state's borders). In this context, EPA must determine what state-law standards are "applicable." Id., 503 U.S. at 110. "[T]reating state standards in interstate controversies as federal law accords

with the Act's purpose of authorizing the EPA to create and manage a uniform system of interstate pollution regulation." Id.

Conversely, a non-TMDL system that imposes speculative burdens -- and does so disproportionately upon attenuated discharges originating out of state -- would be discriminatory and contrary to congressional mandate. Where, as argued below, the Attleboro draft permit limits are more stringent with regard to Rhode Island waters than the limits that RIDEM has applied in word and deed, the permit limits contravene the legislative purpose of uniformity.

Though in a different factual context, the Supreme Court has specifically cautioned against excessive application of the downstream state's regulations:

> If every discharge that had some theoretical impact on a downstream State were interpreted as 'degrading' the downstream waters, downstream States might wield an effective veto over upstream discharges.

Arkansas, 503 U.S. at 111. The parallel concern in this case is that, if Rhode Island can require greater dilution *within its waters* from out-of-state dischargers than from in-state ones, it can shift a disproportionate responsibility and expense of improving its water quality onto those who lack a political voice in Rhode Island's choices. As a matter of policy, fairness and law, EPA must not allow that to occur here and therefore must withdraw the total nitrogen permit limits proposed in the draft permit.

As argued extensively below, Attleboro's concern about even-handed treatment is heightened by the level of speculation and scientific uncertainty underlying Rhode Island's determinations and by Rhode Island's willingness to substitute higher interim nitrogen limits in place of its nominal discharge limits for Rhode Island facilities, for many years, until more is known.

Response #A.2: While we agree that this is a section 401(a)(2) issue, there is no basis for suggesting that a TMDL is necessary in order to issue an NPDES permit with a water quality-based limit for nitrogen, for the reasons discussed above.

In this case, the effluent limit for nitrogen is needed to meet Rhode Island's water quality standards but is not necessary to meet Massachusetts' water quality standards. (See Response #A.1 above). Rhode Island's Water Quality Standards (Regulation EVM 112-88.97-1, June 2000) establish designated uses of the State's waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained. As is detailed in the Fact Sheet and Response #A.1, following the discharge from the Attleboro facility, the Ten Mile River discharges to the Seekonk River in Rhode Island. The Seekonk River is a marine water (seawater) designated as a Class SB1. Designated uses include primary and secondary contact recreational activities and fish and wildlife habitat. *See* Rhode Island Water quality

Standards Rule 8(B)(2)(c). Rhode Island has listed the Seekonk River on the State's 2004 and 2006 CWA 303(d) List of Impaired Waters as a water impaired due to excess nutrients, low dissolved oxygen, and excess algal growth/chlorophyll *a*.

Applicable water quality criteria include the following:

> At a minimum, all waters shall be free of pollutants in concentrations or combinations or from anthropogenic activities subject to these regulations that:
>
> i. Adversely affect the composition of fish and wildlife;
> ii. Adversely affect the physical, chemical, or biological integrity of the habitat;
> iii. Interfere with the propagation of fish and wildlife;
> iv. Adversely alter the life cycle functions, uses, processes and activities of fish and wildlife....

Rule 8(D)(1)(a) (General Criteria).

In addition, all waters shall be free from pollutants in concentrations or combinations that:

> i. Settle to form deposits that are unsightly, putrescent, or odorous to such a degree as to create a nuisance, or interfere with the existing or designated uses;
> ii. Float as debris, oil, grease, scum or other floating material attributable to wastes in amounts to such a degree as to create a nuisance or interfere with the existing or designated uses;
> iii. Produce odor or taste or change the color or physical, chemical or biological conditions to such a degree as to create a nuisance or interfere with the existing or designated uses....

Rule 8(D)(1)(b) (Aesthetics).

> The dissolved oxygen shall be "not less than 5 mg/l at any place or time, except as naturally occurs. Normal seasonal and diurnal variations which result in *insitu* concentrations above 5.0 mg/l not associated with cultural eutrophication will be maintained in accordance with the Antidegradation Implementation Policy."

Table 2, Rule 8(D)(3)(1).

> There shall be no nutrients "in such concentration that would impair any usages specifically assigned to said Class, or cause undesirable or nuisance aquatic species associated with cultural eutrophication." Nutrients "shall not exceed site-specific limits if deemed necessary by

the Director to prevent or minimize accelerated or cultural eutrophication. Total phosphorus, nitrates and ammonia may be assigned site-specific permit limits based on reasonable Best Available Technologies."

Table 2, Rule 8(D)(3)10; see also Rule 8(D)(1)(d).

Additional relevant regulations include Rules 9(A) and 9(B), which prohibit discharges of pollutants which alone or in combination will likely result in violation of any water quality criterion or interfere with one or more existing or designated uses, and prohibit discharges that will further degrade waters which are already below the applicable water quality standards.

The United States Supreme Court's decision in *Arkansas v. Oklahoma*, 503 U.S. 91 (1992), supports EPA's permit issuance in this matter. Among other things, the Court described as "permissible and reasonable" EPA's view that, in issuing a permit to a source in one state, EPA must apply the water quality standards of a downstream affected state. *Id.* at 104. As the City notes, the factual context of that permit was different involving, among other things, construction of the downstream affected state's anti-degradation provision. Moreover, the impact on Rhode Island waters as a result of discharges from the Attleboro WPCF is far from theoretical or imperceptible. The Attleboro facility is about 200 yards from the Rhode Island border and from May through October 2007 discharged an average load of over 900 lbs per day of total nitrogen into the receiving waters.

We disagree that the permit limit imposed is speculative or that limits have been imposed disproportionately upon attenuated discharges from Massachusetts (see Response #A.1). Rhode Island facilities discharging to the same general area as the Attleboro discharge have been given nitrogen limits of 5.0 mg/l. Furthermore, attenuation rates that exist currently in the Ten Mile River are expected to be reduced in the future as the phosphorus-driven cultural eutrophication of the Ten Mile River is addressed. The primary mechanism for attenuation of nitrogen is uptake by aquatic plants (see RIDEM 2005 Response to Comments, p.11). The excessive aquatic plant growth in the Ten Mile River is driven by the high phosphorus loadings to this river. See Response #A.3.a for a further discussion of attenuation.

Comment #A.3: While EPA's draft permit purports to address Rhode Island's Water Quality standards, it duplicates RIDEM's choice in the RIDEM 2004 Evaluation, and relies entirely upon RIDEM's analysis, which is incomplete, contradictory and applied inconsistently, if at all, in practice. *Compare* EPA Fact Sheet, pp. 10-12 (citing RIDEM 2004 Evaluation, comments and RIDEM's response) with attached CDM letter, Exhibit A. The result is a proposed total nitrogen limit that is excessively and discriminatorily strict, compared to Rhode Island's actual water quality standards.

a. By the time effluent from the Attleboro WWTP reaches the Seekonk River in Rhode Island, the concentration of nitrogen has been attenuated. RIDEM used an attenuation factor of 40%. RIDEM 2004 Evaluation, pp. 19, 20, Appendix, Tab 1. As CDM notes, wastewater treatment effluent is only 70% of the total nitrogen load to the Ten Mile River. Therefore, the proposed 8 mg/l limit at the Attleboro plant would only discharge 3.4 mg/l to the Seekonk River (8 x 60% x 70%). Requiring an 8 mg/l concentration of nitrogen at the Attleboro WWTF outfall is excessive to achieve a 8 mg/l (or even a 5 mg/l) concentration of nitrogen from the plant in the Seekonk River, which is all that Rhode Island has nominally required of its in-state plants.

The following table shows the nominal limits contained in RIDEM's recent permits that, assertedly, reflect current application of Rhode Island water quality standards to facilities discharging in Rhode Island, compared to Attleboro's effective 3.4 mg/l discharge:

	May-Oct	**Nov-Mar**
NBC-Bucklin	5.0 mg/l	Operational[13]
E. Providence	8.0 mg/l	Operational
NBC-Fields Pt.	5.0 mg/l	Operational
Woonsocket	5.0 mg/l	Operational
Cranston	8.0 mg/l	Operational
Warwick	8.0 mg/l	Operational
West Warwick	8.0 mg/l	Operational
Attleboro to Seekonk River (and at the outfall)	3.4 mg/l effective (8.0 mg/l nominal)	Operational

Attleboro's discharge to the affected waters thus has stricter proposed limits than all direct dischargers to Rhode Island.

This is particularly hard to understand given the relatively small design flow for the Attleboro facility. As show in the RIDEM 2004 Evaluation, p. 20, Table 4, Attleboro's design flow and estimated May-October design flow ranked 8th out of 10, less than a third of, for instance, the NBC-Bucklin plant (which is allotted 8.0 mg/l in May-Oct.), about 1/6th or the Fields point plant, and behind East Providence and Woonsocket as well.

To be sure, the EPA Fact Sheet asserts that the 40% attenuation figure should be adjusted downward to an extent not specified in the Fact Sheet. Any such adjustment would be speculative, would be overwhelmed by taking account of the

[13] "Operational" means that the permit imposes no limit, but requires the permittee to "operate the treatment facility to reduce the discharge of total nitrogen, during the months of November through April [or March, for Attleboro], to the maximum extent possible using all available treatment equipment in place at the facility, except methanol addition."

fact that WWTP discharges are only 70% of the total nitrogen load, and should await real data as well as the achievement of the improvements upon which EPA's assertion rests. Moreover, as shown by CDM (Exhibit A), EPA's assumptions about reduction in attenuation are based upon erroneous analysis.

Response #A.3.a: EPA believes that the allocation of loads to the wastewater treatment plants discharging to the Seekonk River are equitable and necessary to achieve RI Water Quality Standards. The limitations for the Attleboro treatment plant are less stringent than those for the larger facilities (Upper Blackstone, Woonsocket and NBC-Bucklin Point are either subject to, or proposed to be subject to, final nitrogen effluent limits of 5 mg/l) and should be achievable at a lower cost than the more stringent limit. Also see Response #A.1 above relative to the equity of Massachusetts versus Rhode Island nitrogen limits.

The commenter's calculation of the concentration of total nitrogen discharged to the Seekonk River from the Attleboro facility is based on an incorrect calculation of attenuation as detailed in the response to CDM's comments below.

Additionally, the current assumed attenuation rate (40%) in the Ten Mile River is expected to significantly decrease in the future because nitrogen currently utilized in the phosphorus–driven eutrophication of the fresh water segments of the Ten Mile River and its impoundments is expected to diminish when Attleboro and North Attleborough achieve the more stringent phosphorus limits in their permits. EPA does not regard its position regarding future attenuation rate reductions as speculative. Rather, such a reduction stands to reason given EPA's imposition of a phosphorus effluent limitation, which is designed to control the effects of cultural eutrophication (i.e., excessive plant growth).

The technical evaluation of loads to the Seekonk River that EPA consulted in the course of establishing the permit limit for nitrogen accounts for attenuation (*i.e.*, the loads calculated for the Massachusetts facilities in DEM's calculations in Figure 21 of *Evaluation of Nitrogen Targets and WWTF Load Reductions for the Providence and Seekonk Rivers* have been multiplied by the delivery factor). Obviously, a decrease in Attleboro's attenuation would result in an increase in Attleboro's loading to the Seekonk River. If monitoring shows that the overall load reduction to the Seekonk River is insufficient to achieve water quality standards even after the POTWs achieve their total nitrogen limits, further action will have to be taken and a lower limit imposed.

Comment #A.3.b. While RIDEM's nominal limits are excessively strict when applied to Attleboro's out-of-state discharge, its limits upon in-state plants are illusory. The proposed limits on Attleboro therefore are not required to meet the actual limits of the downstream state.

RIDEM knew that the in-state nitrogen limits would be appealed and settled before the limits would ever be applied: